

Name: _____

at1124exam: Radicals and Squares (v922)

Question 1

Simplify the radical expressions.

$$\sqrt{8}$$

$$\sqrt{20}$$

$$\sqrt{45}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 2}}{2\sqrt{2}}$$

$$\frac{\sqrt{2 \cdot 2 \cdot 5}}{2\sqrt{5}}$$

$$\frac{\sqrt{3 \cdot 3 \cdot 5}}{3\sqrt{5}}$$

Question 2

Find all solutions to the equation below:

$$3((x - 7)^2 + 6) = 93$$

First, divide both sides by 3.

$$(x - 7)^2 + 6 = 31$$

Then, subtract 6 from both sides.

$$(x - 7)^2 = 25$$

Undo the squaring. Remember the plus-minus symbol.

$$x - 7 = \pm 5$$

Add 7 to both sides.

$$x = 7 \pm 5$$

So the two solutions are $x = 12$ and $x = 2$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 10x = 39$$

$$x^2 + 10x + 25 = 39 + 25$$

$$x^2 + 10x + 25 = 64$$

$$(x + 5)^2 = 64$$

$$x + 5 = \pm 8$$

$$x = -5 \pm 8$$

$$x = 3 \quad \text{or} \quad x = -13$$

Question 4

Any quadratic function, with vertex at (h, k) , can be expressed in vertex form:

$$y = a(x - h)^2 + k$$

A quadratic function is shown below in standard form.

$$y = 2x^2 + 24x + 77$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 2 .

$$y = 2(x^2 + 12x) + 77$$

We want a perfect square. Halve 12 and square the result to get 36 . Add and subtract that value inside the parentheses.

$$y = 2(x^2 + 12x + 36 - 36) + 77$$

Factor the perfect-square trinomial.

$$y = 2((x + 6)^2 - 36) + 77$$

Distribute the 2.

$$y = 2(x + 6)^2 - 72 + 77$$

Combine the constants to get **vertex form**:

$$y = 2(x + 6)^2 + 5$$

The vertex is at point $(-6, 5)$.